SEABC NEWSLETTER

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- SEABC's Newsletter is both edited and managed by The Communications Committee. newsletter@seabc.ca
- Submissions to the newsletter are encouraged and all members of the SEABC are asked to actively participate in contributing to our newsletter. Submissions letters to the Editor, questions and comments can be sent to: newsletter@seabc.ca
- SEABC editing staff reserve the right to include or exclude submitted material and in some cases edit submitted material to suit overall space requirements. If submittals are not to be edited, please advise editor at submission time.

Message from the President

November 2011

By Cameron Kemp, P.Eng.;
SEABC President

An update on the activities the Board

Just in case you thought the Board was a bunch of old white-haired guys (and one young female) sitting around telling each other „war stories" about past projects (which we do sometimes!) I thought I would give you a brief synopsis of some of the things we are working on:

- SEABC AGM – We have begun planning for our AGM early next year and are hopeful that we will have a very interesting and world-class structural engineer as our keynote speaker. Stand by while we work to confirm his availability.
- Provincial Emergency Preparedness Earthquake Planning Committee - We have been asked to assist this planning committee with preparing an emergency response plan to deal with the need for immediate structural assessments of buildings, should a major earthquake strike a major urban centre within the province. The basis of our contribution would be training people the use of ATC 20 and forming a list of willing volunteers to provide these assessments should such an event occur.
- Upcoming membership survey - As this Association is only relevant if we are addressing issues that are important to its members, we have decided to survey our members on a two-year rolling basis through a quick and easy online survey. We are working on the survey now and will issue it early in the new year.
- UBC M.Eng. Masters program - We are working with UBC as they look to revamp the M.Eng. program to make it more relevant and accessible to existing practitioners. Look for an update on this in the near future.
- Professional Practice Committee - We are ramping up our liaison with other professional associations and related agencies such as the „AIBC" and „Work Safe BC" to address common issues. We will update you in the new year on the issues we are jointly working on.
- Greater reach to our members - Our recently formed Kelowna chapter is starting to hit its stride as an active group. This group participated in this year's APEGBC AGM.
- Guidance to our members with respect to the provincial delay in adopting the 2010 NBC - Even though NBC 2010 has been adopted federally, we are looking at a significant delay in the adoption/modification of this code into the BC Building Code and the Vancouver Building Bylaw. This potentially creates a dilemma for practicing engineers in that there may be clauses in the new code that improve safety over previous codes particularly in the seismic area. In this edition of the newsletter we are publishing a recommendation to our members on how to deal with this issue.
- Education Committee - Our Education Committee continues to amaze me with the number and quality of seminars and presentations they organize. Expect to see a full slate of relevant and interesting course offerings in 2012.
- In response to ongoing calls from the public about how to source structural engineering assistance, we have created a firm directory on our website that we encourage our members to participate in. This directory will allow the public to find a suitable structural engineer to assist them with their project or problem.
- APEGBC - Organizational Quality Management (OQM) Program - The APEGBC has been working hard on developing an OQM

program that they plan to roll out to their members. The Professional Practice Committee of SEABC has been asked to review and comment on their current draft.

- Liaison with other Structural Engineering Associations (SEA) - Three members of the SEABC Board recently attended the Northwest Divisional SEA conference in Spokane Washington and represented us well at this conference.

Hopefully this summary gives you a sense of the current activities of the SEABC Board and the things we are working on to enhance the value of your membership.

As always we welcome your input to our activities and focus.

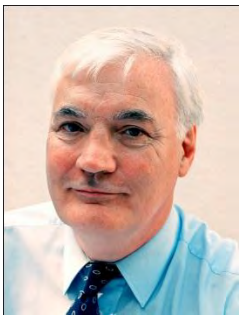
Now…. back to project war stories…. "Did I ever tell you about the project that?……."

IStructE News

By David Harvey, P.Eng, Struct.Eng.
Director SEABC

As the Institution approaches the year-end, we can reflect on the excellent work that Professor Roger Plank has done during his 2011 presidency. Roger, who visited Vancouver for the Structure Congress in 2008 and presented us with a fascinating paper on fire engineering, has worked hard to promote the Institution and the value of membership across the world.

Emeritus professor at the University of Sheffield, Roger"s colourful personality has endeared him to the worldwide membership and helped to build bridges with other engineering bodies. His presidential blog has kept us informed of progress, and helped us understand the challenges of the presidential year.



Next year, the Institution will be led by incoming president John Nolan, a UK consulting engineer and entrepreneur, who will bridge a unique flavour to the presidency. John, who hails from Birmingham, UK, is a Director of Nolan Associates and an engaging person who often has a novel viewpoint on matters which affect structural engineering. John has long advised the Institution with planning for the future of its premises in London. John"s key role in 2012 will be implementation of the strategic plan which is crucial to the Institution"s future.

While at the Institution headquarters, I attended a meeting of the IStructE Council, my last as a past president. This is the culmination of a commitment which started in 2002. I will greatly miss the involvement with the Institution and the wonderful people I have had the pleasure of working with. When I look at what IStructE has achieved during the past decade, I am delighted to see that much progress has been made, particularly internationally where the Institution"s influence continues to grow. Please note, though, that the BC Division, which is operated jointly with SEABC, will continue to be represented at Council meetings. Bill Alcock (M) will be taking on the responsibility from January, 2012. Please contact Bill if you would like any matter brought to the attention of the IStructE Council in London. I will continue in my role of IStructE Representative in BC and will deal with membership and reporting.

Young Members Group

By By Ilana Danzig, EIT, LEED AP and Tyler Best, EIT.

This September we said goodbye to summer and hello to fall with a YMG afternoon at Hastings Racetrack. A group of young engineers met up, watched the races, placed some bets, and had a good time getting to know each

other. This was a fun event and one we will likely repeat.

In October, a group from the YMG joined the CSE Masonry E1 class on their field trip for a hands-on masonry demo. Sponsored by the Masonry Institute of BC (MIBC), a mason demonstrated with ease building a small wall made up of concrete masonry and brick veneer and then „YMG"ers" and students were given the opportunity to build the same wall in small groups. Everyone quickly discovered that it wasn't nearly as easy as the mason made it look.
This event was an excellent chance for engineers to step away from our computers and design notes and get dirty while learning about a material many of us have never built with before.

J.P. LeBerg with MIBC did a great job organizing the event and many thanks go out to Svetlana Brzev for allowing the YMG to join her class for the outing. Thanks especially to the MIBC for sponsoring what turned out to be a fun hands-on evening.

(Photos courtesy of J.P. LeBerg).

The winning wall

Zoran Vukelic demonstrating the tools and technique

Also in October, the YMG made an appearance at Catalyst 2011, an annual conference hosted by the BC Science Teachers' Association, to promote structural engineering and it's applicability in the high school classroom.

Despite the poor weather and early timeslot, a modest group of science teachers showed up for a presentation on structural analysis and introductory earthquake response. Using a mock lesson plan and a number of examples, we demonstrated how structural engineers routinely use concepts such as Newton's Laws, Hooke's Law and friction to do their jobs and discussed how structural analysis is a logical application of these concepts. We then introduced our plan to help science teachers integrate structural engineering into their lessons, which includes providing them with resources such as presentations, exercises, demonstrations and access to guest speakers.

Our presentation was followed by an interactive discussion among those in attendance and it was clear that there was a great deal of interest to use our material to expand on their teachings. The hard work continues as we develop an extensive library of resources to provide to all interested science teachers for their students' consumption. We believe this will eventually become a successful and useful outreach tool and look forward to seeing how it evolves.

This September I attended the SEA Northwest conference in Spokane, WA as a SEABC representative. In the Council meeting, I spoke about

the SEABC Young Member"s Group, how we had developed, and what we were up to. The topic of the YMG and our activities was one of great interest to the Council members, including delegates from Idaho, Washington, and Oregon.

Other SEA's had Young Professional groups but the SEABC YMG was unique in that we had a wide breadth of activities, good participation by our members, and good support, financial and otherwise, from the SEABC Board of Directors. I hope to make further contact with the Young Professional groups of these nearby associations so that we can collaborate with them in the future.

I came out of this event feeling very proud of the YMG group that has developed since 2009 and what we have managed to achieve. I hope to have inspired some of the other organizations, and likewise I got a few good ideas from the other Young Professional groups that we can apply to ours.

The topics of the conference were diverse and interesting. There was much discussion on the changes to the structural engineering registration from Struct. Eng. exams to a standard SE exam. We had presentations on masonry, precast concrete, and steel. Highlights included a fascinating keynote presentation by Ronald Hamburger on the development of performance-based seismic design, and an amazing dinner presentation by David Swanson discussing his reconnaissance missions after the Christchurch, Japan, Chile, and Haiti earthquakes. All in all it was a very educational event and a great opportunity to build ties with other nearby associations.

On the communications front, the YMG recently started helping out with the SEABC Twitter Feed by posting a variety of interesting articles related to structural engineering. Use the feed as a resource for structural engineering news locally and around the world and as well as a great way to stay up-to-date on SEABC activities. I would also like to welcome all SEABC young and new members to join our group on LinkedIn, where we will be posting upcoming events and updates.

The YMG has gone through a few changes and some growth over the last few months. We have become the point of contact for UBC and BCIT student coordination and activities. Engaging the students is a great way to get the word out about SEABC and encourage enthusiasm in structural engineering early on. We have new volunteer student coordinators on our executive committee for both institutions and I am pleased to welcome them all to the team.

I would like to extend a huge thanks to all the volunteers for their hard work and dedication.

If anyone has any ideas, feedbacks, or comments on our progress, please email us at:-

ymg@seabc.ca

YMG Committee:
Ilana Danzig, EIT; Genivar
Tyler Best, EIT; Bush, Bohlman & Partners
Grant Fraser, EIT; Associated Engineering
Chris Hatton, BCIT
Dominic Mattman, EIT; Read Jones Christoffersen
Kevin Riederer, P.Eng; Read Jones Christoffersen
Michael Roberts, P.Eng; Section T Consulting
Shahrzad Talachian, EIT; Hatch Ltd.

UBC Student Reps:
Yuki Kishimoto
Stanley Chan

BCIT Student Reps:
Chris Hatton
Leah Jankola

Technical Committee Update

By Renato Camporese, P.Eng. Struct.Eng. Chair SEABC Technical Committee

No activity has been reported by the active task groups in the recent months.

The announcement by the Building and Safety Standards Branch that the 2010 NBC will not be adopted in British Columbia until

late 2012 has created concerns and confusion within the design community as to the legal and ethical requirements for structural engineers in the interim. The following best practices guideline discusses these issues and provides some guidance in this regard. It is also important to note that, not only the Building Code, but the material codes and standards are also in a constant state of review and update, and that the principals discussed here apply equally to those documents as well.

Recommended Practice for the Structural Design of Buildings prior to the adoption of the 2010 NBCRev2

The 2010 edition of the National Building Code of Canada has been published and is now available to the public.

The B.C. Buildings and Safety Standards Branch, in a March Bulletin, have advised that the next edition of the BC Building Code, adopting the 2010 NBC, will become effective in the fall of 2012. Similarly the City of Vancouver is intending to submit a bylaw to Council in January of 2012 which, if passed, will mandate the 2010 NBC by about June 2012.

For projects under federal jurisdiction, such as military bases, federal prisons, first-nations reserves, airports etc., this is not a problem because they are required to meet the 2010 NBC requirements. For all other buildings however, the structural engineer faces a dilemma. The dilemma is that structural engineers are bound by the code of ethics to:-

"Hold paramount the safety, health and welfare of the public…"

and by inference to be applying the most current knowledge in the field; but also by City and Municipal requirements, which require conformance with the currently adopted code.

Currently the mandatory codes in BC are the 2006 BC Building Code and the 2007 Vancouver Building By-Law. These documents are based on the 2005 National Building Code. The referenced materials standards include CSA standards A23.3-04 for concrete design, (Note that A23.1-09 was adopted by Ministerial Order in Nov 2010 and is therefore the standard for the BCBC only), O86-01 for wood design, S16-01 (including S16S1-05) for steel design and S304.1-04 for masonry design. Standards and amendments or updates published after 30 June 2004 are not considered part of the referenced documents. New editions and/or updates have been issued for all of these standards. How should structural engineers proceed for the next 12 months until the new codes are adopted?

The legal community is of the opinion that continuing to design in accordance with the currently adopted codes and their referenced standards is the acceptable approach, unless there is a significant life safety flaw in the current code arising from new knowledge. In such a case, the structural engineering community could request an emergency code change. Seldom however, are emergency code changes required to address fundamental life safety flaws in the building code.

The process of updating codes and standards allows for the embodiment of recent research and thinking into design and construction requirements which will improve the quality and safety of our buildings. The generally high level of performance demonstrated by buildings constructed under recent code requirements, attests to the quality of our codes and standards. Even buildings designed to much older codes continue to resist required loads and provide satisfactory performance.

The exception to this validation is in the area of seismic loads, for which our existing buildings remain essentially untested.

For the interim period until the new building codes are adopted, SEABC recommends the following:-

- As a basic minimum, all engineering designs for buildings must comply with the current Building Codes and reference standards.
- Engineers are expected to be knowledgeable in the "state of practice" design procedures in their particular field of expertise. This includes an understanding of the latest design standards, even though they are not adopted by the authorities having jurisdiction.
- Engineers are expected to be knowledgeable in technical inconsistencies in the current Building Codes and reference standards. Where solutions to such technical inconsistencies have been developed through

a consensus approach, engineers are encouraged to notify the codes development authorities and incorporate such solutions in their designs.

- Where updated design standards incorporate design approaches that significantly improve life safety, engineers are encouraged to adopt them. For example Update No. 3 to CSA A23.3 requires that closely spaced (anti-buckling) ties be provided in all columns at levels of the building where the SFRS is expected to hinge. This requirement is based on analytical research and recent experiences in large seismic events where building failures have occurred due to failures of gravity columns, even though the SFRS performed well.

- Although not legally required, engineers are encouraged to adopt newer, more restrictive code requirements in their designs if they feel this will result in better structures. If doing this will result in increased costs, the client must be advised of this along with the fact that there is no legal requirement to adopt the more restrictive design details.

- If an updated design standard is utilized, it should generally be used in its entirety, rather than extracting parts and portions. "Cherry-picking" the most liberal clauses of different codes or standards is not acceptable. Design standards are integrated design documents and should not be utilized piecemeal. Even though portions of an updated design standard may include „less restrictive" clauses, the overall document is considered by a Canadian recognized consensus body to be an improvement over the outdated standard. If only a portion of an updated standard is utilized, extreme care must be taken to avoid extracting parts and portions that will result in a hybrid approach that is unsafe.

  The engineer must understand the concepts underlying the portion of the updated design standard well enough that he makes use of the updated approach in its entirety. This applies in particular to clauses that are deemed less restrictive. Furthermore If an updated design standard is utilized, the engineer must carefully coordinate its use with the other design professionals and with other codes and standards. Lastly, and most important, the building authority must be advised, and their approval obtained, prior to proceeding with this approach.

The above approach is also recommended when a design standard is updated subsequent to the publishing and adoption of the National Building Code.

Research at UBC

By Dr. Carlos Ventura, P.Eng

Development of a Database of Seismic Performance of Residential Wood Frame Construction in BC

The Earthquake Engineering Research Facility (EERF) at UBC (Dr. Carlos Ventura, P.Eng., Director), in collaboration with TBG Seismic Consultants Ltd., wishes to ask SEABC members for their assistance in developing a seismic performance database for residential wood frame housing. This work will be undertaken by Jose Centeno, a Ph.D. candidate working under the direction of Dr. Ventura, in collaboration with Dr. Graham Taylor, P.Eng. of TBG Seismic Consultants.

The EERF is offering to undertake a performance-based seismic engineering assessment of SEABC residential wood frame homes in return for permission to add the house data to a residential wood frame database on a confidential basis. SEABC members will be given a short report on the findings and an opportunity to discuss the findings with the report authors. The database is to include single family homes, condominiums and townhouses.

Please send an expression of interest to:-

eerf@civil.ubc.ca

Communications Committee

By David Harvey, P.Eng, Struct.Eng.
Director SEABC

Do you enjoy reading SEABC's quarterly newsletter?

Your communications committee is looking to publish informative articles on topics of interest to structural engineers which are interesting and enjoyable to read.

The committee looks after the quarterly newsletter, web site, and membership. We believe that newsletter is widely read and the web site is in widespread use (see the Webmaster's report elsewhere in this issue). Encouragingly, membership is now over 900 and is increasing. Our members interested in structural engineering recognize the value in supporting SEABC and accessing its many member services.

At only $75 plus $9 HST for individual or associate membership, and no charge for student membership, the annual dues are unchanged for 2012. This represents excellent value as you can recoup your membership fee by attending a single seminar, while enjoying the benefits of membership and staying in touch with the structural community.

To make our newsletter even better we are looking for your help. We need stories and photographs which describe what makes your favourite subject of interest to you. So please send details of your projects, activities or research, as well as giving your opinion on current issues affecting structural engineers. We publish articles, photographs, papers, and letters to the editor - thank you for your contribution. We look forward to having you back with us as an SEABC member in 2012 - and please encourage your colleagues to join too.

2012 Membership

Your current SEABC membership expires on December 31, 2011. Please remember to renew your membership for 2012 at your earliest convenience. Your options are to renew online at:-

www.seabc.ca/members/login.php

Or, complete the application form at:-

www.seabc.ca/documents/forms/Membership_Application.pdf

Corporations can submit a bulk application for all their staff members by mail. The membership fee is unchanged at $75, plus $9 HST. Note the significant value of membership – you will recoup your membership fee at the first time you enrol in an SEABC seminar or Certificate Program course.

Student members can join at no charge but also must renew their membership each year. Please remember to keep your contact information up to date in order to receive all SEABC communications!

2011 APEGBC Annual Conference

By Solomon Tesfamariam

On Friday, October 14, 2011, as part of the APEGBC's 2011 Annual Conference, the structural engineering stream, coordinated by the SEABC, took place in the Pennask Room at the Delta Grand Okanagan Hotel in Kelowna. The session was moderated by Solomon Tesfamariam, assistant professor at UBC's Okanagan campus. The stream included four popular sessions, with attendance varying from 20 to 90 people.

The first session was on *Guardrails* presented by Robert Jirava PEng StructEng. Robert discussed the recent challenges and effective solutions developed in the guide for the design of

guardrails. Robert pointed out that for many years guards (guardrails) have had problems in achieving code compliance. Problems have included the lack of proper design and poor construction, especially in the case of aluminum railings. Robert also described developments in the design and manufacture of base plates for aluminum guardrail systems. The session was informative, and a lively discussion followed the presentation.

The second session on the new *Port Mann Bridge* was the highlight of the structural engineering stream. The presenters were David Goodyear, PE, Senior Vice President and Chief Bridge Engineer of TY Lin International; and Ross Gilmour, PEng, from Peter Kiewit Infrastructure. Crossing the Fraser River between Coquitlam and Surrey, the new Port Mann Bridge is the centerpiece of the new 40 km long Highway 1 widening project currently under construction. The 2 km long bridge crossing includes precast segmental concrete approaches and an 850 m long main cable-stayed section, carrying a total of ten traffic lanes. David gave a detailed and informative presentation, from conceptual to final design, highlighting the design challenges, and describing the innovative design procedures adopted during development of the engineering solution.

Ross"s presentation followed with a detailed account of the construction process. Construction of a project of this magnitude has many challenges, and Ross provided a detailed description of Kiewit"s innovative approach. A particular point of interest was the 54 MN static pile test, the largest externally-reacted test load on record for a bridge foundation pile. This test, coupled with a pile uplift test, enabled the foundation piles to be optimized, which resulted in an overall saving of approximately $30M.

The third session entitled *BC Place Base Building Upgrade*, was presented by Adam Patterson, EIT, from GENIVAR Inc., and Dr. Mahmoud Rezai, PEng, StructEng, from EQ-Tec Engineering Ltd. The presenters highlighted the extensive structural upgrade that the BC Place stadium has recently undergone. The upgrading work included the gravity elements of the stadium supporting the new roof and an extensive review of the stadium"s lateral load resisting system.

As part of the improvements in the lateral load-resisting system, 96 viscous dampers were installed in the stadium at existing expansion joints to absorb seismic energy. Mahmoud described the analytical work undertaken to determine the location and number of dampers used. Connecting the new roof at BC Place to the existing structure"s lateral-load resisting system also presented challenges which are unique to long-span structures. Adam explained that the design team reviewed several options to introduce ductile links between the new and existing structure.

The final session was on *Expanding Performance Objectives Beyond Life Safety for Seismic Retrofit of BC Schools*, in which Dr. Graham Taylor, PEng, gave a detailed account of the eight-year development of the BC school seismic mitigation program. Under the current seismic retrofit guidelines, life safety is the sole performance objective. Graham explained that the next edition of the seismic retrofit guidelines will be expanded beyond the life safety performance objective. His presentation described the impact of a comprehensive set of performance objectives on seismic engineering in general and on the retrofit of BC schools in particular.

SEABC thanks the APEGBC for their cooperation in including the structural engineering presentations in this year"s Annual Conference.

Professional Engineers and Geoscientists of BC

Note that audio recordings of these sessions synchronized with PowerPoint will be available shortly through APEGBC"s Online Learning Centre. Visit the following link for more details:-

www.apeg.bc.ca/ac2011/prodev/recordings.html

Steel Day

By Yuki Kishimoto and Stanley Chan

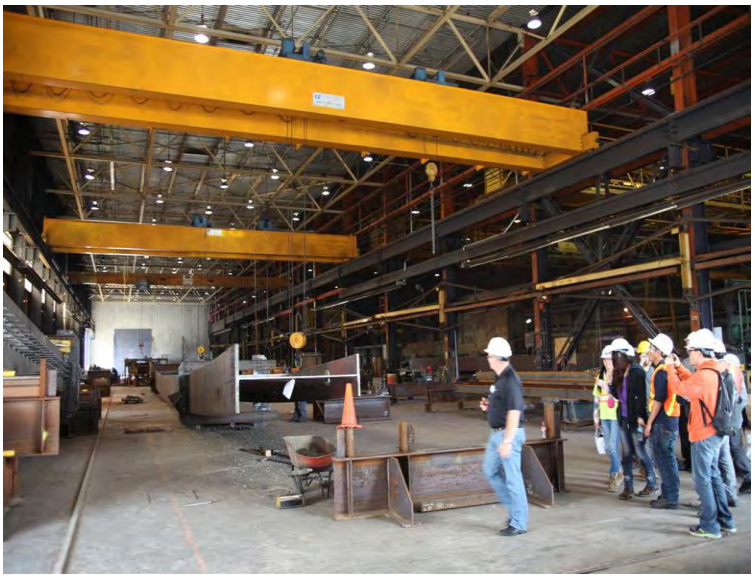
Steel Day, a public event held annually to promote the design, construction, and fabrication of steel as a structural material, was introduced to UBC students for the first time this year. Organized by the Canadian Institute of Steel Construction, Steel Day is a collaboration of steel fabricators, galvanizers, mills and other related facilities that are committed to promoting the importance of steel nationally.

On September 24th, civil engineering undergraduate students from UBC had the exciting opportunity to join engineering professionals, educators, and steel experts on a tour held at Canron Western Constructors Limited. Canron is one of the leading steel fabricators in Western Canada and is located on Annacis Island.

The trip to Canron was sponsored by SEABC in collaboration with the Canadian Society for Civil Engineering Student Chapter at UBC to allow 17 UBC students to participate. Steel Day afforded UBC students many exciting networking and educational opportunities and sparked interest in aspects of materials engineering that will affect their future careers.

They enjoyed the tour through the steel fabrication facility, observed the power of advanced machinery and conversed with industry experts in steel design. Upon discovering large-scale steel girders being fabricated for the new Port Mann Bridge and observing advanced welding techniques, UBC students found themselves forging a strong connection between their Steel Design courses at UBC and the innovative designs seen at the facility.

On behalf of the UBC students, we would like to extend our appreciation to SEABC for making this event possible.



Education Committee Update

By Cam Smith
Chair, SEABC Education Committee

In the interest of providing the SEABC Membership with dynamic discussion topics, the next evening seminar, scheduled for November 30th, is titled:-

"*An Introduction to Blast-Resistant Design*"

Rainer Herzinger, Ph.D., P.Eng. of Stantec Consulting Ltd. will be presenting on various aspects of blast-resistant design, including characteristics of blast waves and their effects on structures, the use of single degree of freedom systems and finite element modeling, and differences between seismic design and blast-resistant design. Blast-resistant detailing of reinforced concrete elements and design methods to prevent progressive collapse will also be discussed during the seminar.

This event is free to SEABC members; registration details for this, as well as other future events, can be found on the SEABC website at:-

www.seabc.ca/commerce/seminar_20111130/

The SEABC Education Committee is currently busy organizing seminars for the upcoming months, some of which include: „*Wood Frame Moment Connection Design*", „*BCBC 2012 (NBCC 2010) – Changes to the Code*" and „*ATC-20 – Post-Earthquake Safety Evaluation of Buildings*". In addition, the Education Committee is also organizing the upcoming SEABC Annual General Meeting, scheduled to be held in early March. Official announcements for these events will be made as details are finalised.

Past events included the August 12th one-day seminar "*Performance-Based Plastic Design of Structures*" which was presented by Dr. Subhash Goel and Professor Emeritus at the University of Michigan. The presentation, held at UBC Robson Square, was very well attended, and we would like to acknowledge our fellow SEABC Education Committee Member, Professor Tony Yang of the Department of Civil Engineering of UBC, for his efforts in organizing this successful event.

Other recent events, provided free to SEABC members, included the October 12th Wine and Cheese Reception held at UBC and the July 27th presentation "*SEABC Taskforce on Guard Rails – Design Practice and Construction Issues*" given by Robert Jirava, P.Eng., Struct. Eng., of RDJ Structural Designs Ltd.

Video recording and archiving continues to be done for the majority of seminars and events; note that as recordings require some editing prior to uploading to the website, please be patient if you are looking for a specific webcast immediately following the event. This service has been very effective at providing access to seminars and events for those who are unable to attend in person. We would like to thank long-standing SEABC Education Committee Member, Andrew Seeton, for his success at implementing this service. Video archives are available through the SEABC website:-

www.seabc.ca/seminar_downloads.php

As always, we appreciate feedback from members including comments on past events, suggestions for future topics, and proposals for presentations, so please do not hesitate to contact us at:-

education@seabc.ca.

Cheese and Wine at UBC

By Andrew Seeton, P.Eng., M.A.Sc.

On October 12, UBC hosted a Cheese & Wine reception for SEABC members. A tradition since the days of VSEGS, the intent of this event is to provide an opportunity for practicing structural engineers to visit UBC Civil Engineering and find out what is new in structural and earthquake engineering research.

The event also provides a social mingling opportunity for SEABC members and UBC faculty and students. Unfortunately this year there was a miscalculation in the time required to obtain a liquor licence. As a result, the evening featured plenty of Cheese and a notable absence of Wine. Non-alcoholic beer was provided and a group visit to a licensed establishment at the end of the evening was arranged for those interested. Next year there will be both Cheese and Wine at the Cheese & Wine – we promise!

The evening began with a welcome by Dr. Tony Yang, one of the newer members of the UBC structural engineering faculty. Dr. Yang gave an overview of the structures group faculty members and their research interests.

Next, he presented a live demonstration of UBC's new capabilities in hybrid testing. This technique combines physical testing with concurrent analytical modelling to investigate behaviour of a structural system. Typically, a component of the system, (such as a beam-column connection for example), will be physically tested in the laboratory and the force or displacement input/responses are linked in a feedback loop to a computer model of the full system (such as a multi-storey building frame). This allows the investigation of large structural systems that would normally be too large to build and test at full-scale in a laboratory. Further, because the link between the physical specimen and the analytical model is made over a computer network, it is possible for multiple research laboratories from around the world to collaborate on simultaneous investigation of complex structural systems having multiple interacting components. In this way the resources of multiple research facilities can be pooled together.

The attendees enjoyed a tour of the Structures Lab and Earthquake Engineering Research Facility. Several test specimens were on display with corresponding technical posters prepared by UBC graduate students. Ongoing research projects on display included:

- Compression zone buckling of tall reinforced concrete block masonry walls. (Dr. Ken Elwood and Nazli Azimikor)
- Out-of-plane shake table testing of unreinforced masonry walls including effect of diaphragm flexibility. (Dr. Ken Elwood and Osmar Penner)
- Effect of stirrup hook orientation on shear capacity of concrete I-girders. (Dr. Perry Adebar and Macarious Hui)
- Flexural behaviour of rectangular wall-columns typical of those found in Vancouver high-rise buildings (Dr. Perry Adebar and Helen Chin)
- Effect of minimum column ties on axial strain capacity of concrete walls. (Dr. Perry Adebar and Amir Lorzadeh)

End region buckling behaviour of tall reinforced concrete block masonry walls.

2011 Structural Awards

By David Harvey, P.Eng, Struct.Eng.
Chair, SEABC Communication Committee

My recent London visit culminated with the 44th IStructE Structural Awards, widely acknowledged as the premier celebration of structural engineering worldwide. This year the event was especially impressive with superb audio-visuals; and was fantastically emceed by IStructE President Roger Plank and IStructE Chief Executive Martin Powell.

As a continuing awards judge again this year I can confirm that the over 100 entries were of a very high standard and testified to the breadth and quality of global structural engineering practice. It was a challenging but exciting task of selecting winners from the seemingly vast array of entries.

From the winning and commended projects, the outstanding ones for me were the impressive Elsinore Culture Yard; the towering Khan Shatyr Entertainment Centre; the highly successful Dublin Airport Terminal Two; the very sustainable Port Philip Estate Winery; and the radically transformed Royal Shakespeare Theatre. These amazing projects were among the worthy winners announced at the Structural Awards night.

BC engineering was well represented; Fast & Epp"s projects had been shortlisted with the Arena Stage at the Mead Center for American Theater under Arts or Entertainment Structures; and with the Bridge of Dreams in two categories. To great excitement, the Bridge of Dreams was announced as the winner in the Award for Small Projects! The bridge was constructed at the site of an old railway bridge by StructureCraft Builders Inc. for the City of Princeton.

Finally, after much anticipation, came the announcement of the winner of the Supreme Award for Engineering Excellence – the London 2012 Velodrome – a superb example of cutting edge engineering. The award was given to Expedition Engineering. Altogether, this was a fantastic showcase of structural engineering, which had those attending eagerly anticipating the 45th IStructE Structural Awards.

Princeton BC's Elegant Bridge of Dreams Emerges as a Worthy Winner in the Small Projects Category

London 2012 Velodrome

Gerry Epp receives his winning award from Institution President Roger Plank

Expedition Engineering Team Accepts the Supreme Award for the London 2012 Velodrome

Funding for SMSL

By Solomon Tesfamariam

School of Engineering "smart materials" for public infrastructure research receives funding.

On September 1, 2011 in Kelowna, „The Smart Materials and Structures Laboratory", (SMSL) for Innovative Civil Structure, received $992,199 in funding. The federal government's Canada Foundation for Innovation (CFI) has contributed $389,316; the same amount of is expected from British Columbia Knowledge Development Fund (BCKDF) and the remaining will be supported from the equipment supplier.

UBC School of Engineering Civil engineering Assistant Professor Shahria Alam, principal investigator (PI), says his project aims to develop innovative and adaptive civil infrastructure that can withstand extreme loads including earthquake, vehicular collision and blast loading. The co-PI of this grant, Assistant Professor Solomon Tesfamariam, is currently co-investigator in an NSERC Strategic Network grant where he is developing a next generation steel-wood hybrid mid-rise building. Outcome of this research will increase volume of wood used in existing steel building designs, and will increase competitiveness of the wood industry in British Columbia.

"The Federation of Canadian Municipalities estimates that major Canadian cities face an infrastructure deficit of approximately $44 billion just to maintain the current level of service. About 20% of the 60,000 bridges and 10,000 parking garages in Canada are in need of major rehabilitation or replacement," says Alam. *"Our next generation structural components will lead Canada significantly closer to the ideal safe and sustainable infrastructure."*

The research program will develop smart structural components and retrofitting/rehabilitation techniques and also provide guidelines and tools for practitioners to design and analyze structures. The smart infrastructure built in this laboratory will be able to limit its own damage and adapt to extreme loading conditions.

The funds from the CFI-Leaders Opportunity Grant will be used to purchase a set of equipment and upgrade the loading capacity of the floor of the research lab, making the facility the only one of its kind in B.C."s Interior.

The British Columbia Knowledge Development Fund helps public post-secondary institutions, teaching hospitals and affiliated non-profit research agencies to invest in research infrastructure. The Canada Foundation for Innovation funds support the creation of research infrastructure in various non-profit institutions, including universities, and build capacity for innovation.

The new building and high head structural lab.

BCIT Media Release

By Christina Minton

New Dean of BCIT School of Construction and the Environment

Rod Goy, who has served for many years as the Associate Dean of the School of Construction and the Environment at the British Columbia Institute of Technology (BCIT), has been named Dean of the School of Construction and the Environment. He has spent the last 18 months as acting Dean and is looking forward to his new leadership role.

"This is a great opportunity to provide leadership for the School of Construction and the Environment, and to help BCIT continue to be an integral part of the economic and environmental prosperity of BC," says Rod Goy.

Rod has also been responsible for the Industrial Construction Group at BCIT and was previously responsible for the province"s largest electrical trades training and steel trades programs, including security systems technician, iron working, metal fabrication, welding, sheet metal, mining and piping trades at BCIT.

With over 19 years of leadership experience, he has made many contributions to the construction industry and trades training programs through his work on various government and industry run programs.

Rod was the Training Director of the Electrical Construction Industry Joint Training Committee for 12 years before joining BCIT and he currently holds memberships with the Wood Sector Council (WSC), and the BC Aboriginal Mine Training Association (BCAMTA). Since joining BCIT in 2004, Rod continues to forge connections with industry through his work on various regulatory government and industry bodies including sector councils. He was one of the inaugural board members on the Industry Training Authority, which manages BC"s industry training system.

In addition to this list of responsibilities, Rod has managed the School"s training and education services to the manufacturing sector of the wood and forest products industry.

For more information on this release, please contact Christina Minton, Media Relations Coordinator at 604-456-1217 or email christina_minton@bcit.ca. You can also contact Marita Luk, Business Development Manager, BCIT School of Construction and the Environment at 604.451.7188 or email:- marita_luk@bcit.ca.

Rod Goy brings over 19 years of experience to a new leadership role at BCIT

SEABC Twitter Feed

By Grant Fraser

The SEABC has revitalized its Twitter feed! Managed by Stephen Pienaar and Grant Fraser (of the YMG), the goal of the feed is to provide members with regular updates on SEABC events, as well as links to interesting structural engineering and construction articles from around the world.

Below are summaries of some recently-tweeted topics:-

Researchers at University of Nevada, Reno have tested the seismic behaviour of a 2/5 scale horizontally curved steel bridge, loaded with six pickup trucks. Using four 50 ton shake tables, they monitored both superstructure and substructure behaviour. The aim of this research is to frame changes in current codes regarding design of horizontally curved structures under strong earthquake motion:-

www.bit.ly/mPzW41

An architect at MIT is working to develop the use of 3D plotting for building materials. The goal of this is to more cost-effectively create test specimens and even fully-functional pre-fabricated structural components.

www.onforb.es/pwmgEB

Following earthquake and hurricane events in the Eastern US, building researchers from the National Institute of Standards and Technology warn that current building codes do not account for the increased risks due to multiple hazards. They are continuing research in this field, with the goal of proposing modifications to building codes where the risk of multiple hazards is above average.

www.bit.ly/qesx4Q

Please follow us on Twitter (@SEABC, or follow the link on the SEABC website) for regular updates.

Report on Earthquake in Japan

Taken from EERI Website

The 3rd report in the LFE Series on the March 11, 2011, Japan earthquake and tsunami is a 14-page article on the tsunami"s effects on structures, authored by the tsunami team sponsored by the American Society of Civil Engineers.

The report covers the topics of tsunami warning and response, tsunami flow velocity, tsunami loads and effects on structures, design for tsunami effects and seismic effects, and conclusions and recommendations.

Reports on other aspects of the tsunami (source, measurements, arrival, deposits, effects elsewhere in

the Pacific, hazard assessment, and recovery) and the impacts of the earthquake on bridges and buildings will be posted in October.

The 1st in the series, an EERI-ISSS report on Societal Dimensions, is available at:-

www.eqclearinghouse.org/2011-03-11-sendai/files/2011/03/Japan-SocSci-Rpt-hirez-rev.pdf.

New Textbook

New Steel Design Textbook by SEABC CSE Instructor Andy Metten

SEABC member Andy Metten, P.Eng., Struct. Eng. has recently published the first edition of his new textbook "Structural Steel for Canadian Buildings – A Designer"s Guide."

Since 2000, Andy has been the instructor for the SEABC Certificate in Structural Engineering course E4 – Structural Steel Design for Buildings. The course has now been offered 8 times to more than 300 students, and continues to be one of the most popular CSE courses. During each offering of the course, Andy"s course notes have grown and been updated. Andy has now compiled these notes into a textbook format. The textbook will be used in future offerings of the E4 course, as well as the 4th year steel design elective course at UBC for which Andy is a sessional instructor.

This book takes a practical, design-office approach to structural steel. It covers subjects that are not traditionally treated in steel design books, including conceptual design, roof deck, floor deck, open web steel joists and HSS trusses, shop drawings, and seismic design. The book covers steel design in the context of the NBCC 2010 code and S16-09 standard, with a focus on structural systems more so than individual elements. Current design practice is demonstrated by worked examples. Structural Steel for Canadian Buildings has been written by a practising structural engineer for practising engineers and presents the reader with a practical approach to steel design.

The first edition of this textbook was self-published through the UBC Bookstore and the first printing has already sold out. Andy is working with CISC to potentially publish the second edition more widely. Stay tuned!

Northwest Council Meeting

By David Harvey, P.Eng, Struct.Eng.
Director SEABC

For 2011, it was the turn of SEAW"s Spokane Chapter to host the Northwest Council Meeting and Conference. SEABC Directors Bill Alcock, Ilana Danzig and myself represented SEABC. We joined delegates from our counterpart SEAs in the north-western United States for the Council meeting and the technical sessions.

The Northwest Council was attended by 14 delegates and guests. The meeting agenda started with delegate introductions and a warm welcome from Chair Ed Huston from SEAW Seattle. With the 2010 minutes approved, attention turned to the 2009 conference which had suffered poor attendance as a result of the global economic collapse. The conference losses were offset by drawing down the Northwest Council"s seed money for future conferences which resulted in a net loss to be shared by chapter members of

approximately $8,000. This is the only loss in the history of the Northwest Conference and increased efforts will be made to minimize financial exposure in planning future events.

In 2010 SEABC hosted the Northwest and Western conferences at the APEGBC Annual Conference which eliminated any financial risk. Encouragingly there was a much better conference turn out at the Northwest Conference in 2011; and the organizers from the Spokane Chapter were diligent in negotiating a favourable hotel contract and limiting the financial risks. At this time the 2011 Northwest Conference is anticipating approximately $4000 in excess revenue which will represent a good start on rebuilding the seed money. To assist future conference organising groups, the Council approved the creation of a procedures manual based on the experience with recent events which should assist in reducing future risks. In 2012 the Northwest Conference will be hosted by SEAO who will be holding the conference at Kahneeta Resort, Warm Springs, OR, on July 26 and 27 – mark your diaries!

Ed Huston then summarized the experience with the new NCEES 16-hour structural exam which achieved a 27% pass rate in its first year of operation. The reports from member organizations followed and SEABC"s activities aroused considerable interest, notably the seminars we have organized, the CPD material available on the website, and the YMG activities.

Extending “member” pricing to all members of NWCSEA member organizations is a desired objective, which the various chapters will need to consider. The opportunity to share resources, particularly with respect to professional development was discussed. This is becoming more critical as mandatory CPD is introduced; the required legislation is imminent in Washington. SEABC has asked Ed Huston to undertake an ATC-20 post-seismic building inspection training seminar in BC – look out for announcements from SEABC.

Following the Council meeting, the Northwest Conference featured nine informative presentations:

- Brian Johnson of Autodesk, described his vision for the future of Building Information Modeling, upcoming technical innovations and the opportunities that will be available to structural engineers using cloud computing technology.

- Ed Huston of Smith & Huston, Inc., described the recent code advances which improve the design rules for masonry walls and harmonize the outcome using the Allowable Stress Design and Strength Design code provisions.

- Brandon Erikson of Erikson Structural Consulting Engineers, PC, described some interesting applications of seismic upgrading using centre coring; where cores are drilled down the middle of masonry walls, reinforcing bars are installed, and subsequently grouted.

- Sue Frey of CH2M Hill, described the various legislative changes, practice restrictions and title restrictions that have occurred in the US licensing jurisdictions as a result of implementing the NCEES 16-hour structural exam. Sue further outlined the portability of exam credits, explored the structure of the 2011 exam, and listed available study materials and refresher courses.

- Dave Swanson of Reid Middleton Inc., described the recent earthquake reconnaissance missions in which he has participated and the benefits that he obtained from his field visits. Dave has led many earthquake reconnaissance teams, but focused on his field observations following the Christchurch and Japan earthquakes. While in Japan the media attention was centred on damage to the Fukushima nuclear power plant, Dave and his team toured the devastated areas examining building damage from the earthquake and tsunami and listening to stories of the survivors. In Christchurch, Dave"s team recorded details of damage to buildings and infrastructure, and investigated the performance of various buildings that had been retrofitted.

- Pail Hopkins of Hopkins Structural Design Solutions LLC, and Kris Brown of Central Premix Prestress Co., described a full-scale test of a precast sandwich panel to confirm the effectiveness of the product"s carbon fibre shear grid in achieving composite behaviour.

- Sara Ganzerli of Gonzaga University, described her research into the use of natural wood and stone materials in the Walser houses of Alagna Valesesia, Italy. Sara"s fascinating talk detailed the sustainability and fine craftsmanship of the Walser houses, many of which still survive, and provided insights into the lifestyles of the Walser people, whose descendants still live in the region adopted by the early settlers.

- The keynote address was given by Ron Hamburger of Simpson, Gumpertz &Heger, who described the FEMA P-58 / ATC-58 project which he chairs. Ron described the history of seismic design and the benefits of performance-based seismic design. Ron"s committee was tasked with developing the next generation performance based seismic design methodology and has developed a comprehensive model which predicts performance under specified ground motions using a probabilistic approach. The model computes response, damage, casualties, repair costs and down time based on the structural and non-structural systems and their characteristic fragility specifications. These measures are expressed as expected performance with a 90% confidence level for specific scenarios, including annualized averaged losses. The next generation performance based seismic design methodology is not intended to be applied in every situation; instead, it is expected to be of value to owners who require prediction of seismic design performance for operational planning purposes and a more rational approach to seismic design which can be much more economical in cases where high seismic performance is required. The project was initiated in September 2001, and is expected to be complete by the end of the year. More information can be found at:-

www.atcouncil.org/Projects/atc-58-project.html

- The wrap-up presentation was given by Heath Mitchell of AISC, who explored the 2005 AISC Seismic Design Manual. The document is a very useful guide to designers of steel buildings and includes examples of commonly-used framing systems. The manual lists prequalified connection details for moment frames and other useful resources.

Those attending agreed that the 2011 Northwest Conference was both informative and enjoyable. Look out for future conferences in SEABC event announcements, particularly if you are interested in structural engineering south of the border.

Keynote presenter Ron Hamburger at the 2011 Northwest Conference

Sustainability Design Education

By Mark Porter, P.Eng., Struct.Eng. LEED AP

With permission, the following short paragraphs have been taken from a recent article in Environmental Building News. They speak of the importance of the Structural Engineer being involved early in the design process.

Structural choices can lighten the environmental impact of buildings but only if you start early and understand all your options.

The structure comprises the most massive and permanent elements in a building. Structural choices have a major effect on a building's environmental impact and the structure is nearly impossible to alter once the design process is under way. Yet unlike mechanical engineers who are increasingly invited to the table early in a green design process, structural engineers are all too often left out of those early brainstorming sessions. By the time they do get involved, the most elegant and cost effective structural sustainability opportunities have been missed.

"There is a close connection between structural design and architectural design",

Lance Hosey, AIA told EBN. Hosey, CEO of the non-profit GreenBlue and author of a forthcoming book from Island Press on sustainability as it relates to form and structure, argues that we build rectangular structures, not because they are more beautiful, functional or structurally sound, (they are none of the above, he claims), but because their components are easy to mass-produce.

"Form does not follow function" he says. Rather, in day to day practice*, "form follows industry."*

Hosey believes that sustainable design will never reach its full potential until it addresses structure at a deeper level.

"We tend to think of sustainabily as something that lives in a technical manual and not in the napkin sketch",

Hosey told EBN. In order to make our buildings as sustainable as possible, he says we need to start thinking about structural options at that "napkin sketch" phase. The engineers themselves sound eager to be included:-

"We've been looking to have our interests and our influence on green buildings more widely recognised,"

says Mark Webster, PE, senior structural engineer at Simpson Gumpertz & Heger, echoing the sentiments of several engineers EBN spoke to. *"The first thing is getting it on the radar of designers."*

(Written by Paula Melton and Nadav Malin)

On the Web

By Stephen Pienaar, P.Eng; SEABC Webmaster

On the Web

To be a healthy association of professionals, the SEABC has to reach out to its members and the public. Through our website, we are currently doing this with the **SEABC Forum** and the new **Directory of Structural Engineering Firms**.

Directory of Structural Engineering Firms

The SEABC Directory of Structural Engineering Firms went live in October. At the time of writing, the Directory included more than 50 member firms.

SEABC has been receiving phone calls and email from members of the public on a weekly basis; people are looking for structural engineers. With the Directory now easily accessible on our website, we have made it easy and quick for people to find a structural engineer for a given task. At the same time we have also removed the necessity for the Board to directly respond to such requests.
The Directory uses a very simple search procedure: the user selects a location (e.g. Lower Mainland, Okanagan, etc.), type of structure (e.g. single-family

residential, light industrial, etc.), and service required (e.g. structural design, seismic assessment, etc.). The results page then shows matching firms with their contact details and practice information.

Most enquiries deal with smaller projects such as home renovation. For this reason (and because we did not want firm AAA Consulting to always be at the top of the list) we decided to not use a simple alphabetic listing, but implement a simple "relevance" ranking system instead. The search algorithm considers a firm to be more "relevant" if it has a presence in fewer locations and operates in fever industries. This way local firms specialising in a specific field will feature more prominent in the search results than large firms that work in many industries and in many parts of the province. Larger firms show up more often in search results but usually a bit a lower down.

We would appreciate your participation:-

- If you have not yet listed your company, we invite you to do so at:-

  www.seabc.ca/corporate

- If you have listed your company, please let us know if you think the Directory is fulfilling its purpose, and send us your suggestions on how we can improve it.

The new Directory of Firms is available on the SEABC website via the **Find an Engineer** link on the home page as well as the **Contact Us** link at the top of other pages.

SEABC Forum

Did you know that your SEABC membership automatically grants you access to the SEABC Forum?

Activity on the Forum has unfortunately slowed in recent months, and we want to encourage all members to join in blow new life into the system.

By participating in the Forum, you will help build a support network for the local structural engineering community. With your contribution the SEABC can establish an invaluable structural engineering resource. Please post your structural engineering questions and experiences on the Forum and/or respond to your fellow members' questions. To log in to the Forum, please go to:-

www.seabc.ca/forum.

Suggestions

We welcome your comments for improving our website and online member services. Please send your suggestions to:-

webmaster@seabc.ca

or post it on the SEABC Forum.

Ask Dr. Sylvie

CISC published Ask Dr. Sylvie articles in Advantage Steel up until Edition 34 available at:
www.cisc-icca.ca/content/publications/publications.aspx

See also the list of CISC technical resources at:

www.cisc-icca.ca/content/technical/default.aspx

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Mark Your Calendars

Site Registration Option: Use the **SEABC Forum** to arrange a get-together with other SEABC members and share the costs of a single site registration

ASCE Live interactive Web Seminars

ASCE Live interactive Web Seminars

- Verification of Computer Calculations by Approximate Methods
  November 28. More info...
- Design of Wood Beams and Joists
  November 29. More info...
- Deflection Calculation of Concrete Floors - Immediate; Long Term; Cracking
  December 1. More info...
- LRFD for Geotechnical Engineering Features - Earth Retaining Structures: Mechanically Stabilized Earth (MSE) Walls
  December 2. More info...
- Foundations for Metal Building Systems
  December 6. More info...
- Wind Design for Components and Cladding
  December 7. More info...
- Design of Wood Diaphragms and Shear Walls
  December 8. More info...

- Preventing Bridge Damage During Earthquakes
  December 15. More info...
- Designing Buildings with Overhead Cranes
  December 20. More info...

Site Registration Option: Use the SEABC Forum to arrange a get-together with other SEABC members and share the costs of a single site registration fee.

Conferences

These are going to be inspiring sessions, with a theme of "Innovative Wood Design in Europe & Here in BC", and among the speakers will be two from Bern University in Switzerland. There will also be information and a presentation on the recent update to the Building Enclosure Design Guide for Wood-Frame Multi-Unit Residential Buildings, and a session about Lessons from the Living Building Challenge. Of course there will be exhibits, expert advice and information about wood products. The luncheon conferences are of special interest to the design and construction community and local government officials.

The admission is FREE, and there's a complimentary hot luncheon for all pre-registered guests. *The seminars provided are recognized by the Architectural Institute of BC for 3 core LU's. Professional Development certificates are available to all participants towards their continuing education program.*

For more information please see the flyer at the end of the newsletter or go to:-

www.cwc.ca/index.php?option=com_content&view=article&id=53&Itemid=81&lang=en

Seminar Recordings

April 20: Fibre Reinforced Polymer (FRP) - Design Fundamentals, Considerations, and Application
Presenter: John Sherstobitoff, P.Eng., Ausenco Sandwell

May 31: Christchurch Earthquake and Lessons for BC
Presenters: Dr. Ken Elwood (UBC) & Mr. Patrick Ryan (City of Vancouver)

July 27: SEABC Taskforce on Guardrails - Design Practice and Construction Issues
Presenter: Robert Jirava, P.Eng., Struct. Eng., RDJ Structural Designs Ltd

To view the seminar recordings, open your web browser at www.seabc.ca/seminar-downloads and log in using your membership number and password. (If you have not activated your online profile before, you will need to do so before logging in.)

SEABC Annual General Meeting

SEABC Annual General Meeting – Sutton Place Hotel Vancouver – Thursday March 8th 2012. More information will be shown in the next SEABC newsletter.

Winter 2011

"Dynamics of Urban Earthquake Risk: A Vancouver Case Study"

DATE: Monday, December 5th, 2011

TIME: Door opens at 6:00 pm, Lecture begins at 6:30pm

LOCATION: Room C300, UBC Robson Square

SPONSORED BY: Earthquake Engineering Research Institute (EERI), SEABC

Seating is limited. Pre-registration is recommended at www.seabc.ca/chang

Dr. Stephanie Chang

Professor, UBC School of Community and Regional Planning (SCARP) and the Institute for Resources, Environment, and Sustainability (IRES). Canada Research Chair in Disaster Management and Urban Sustainability

ABSTRACT

This presentation explores the question of how urban seismic risk is changing over time. Global trends indicate that economic losses from natural disasters are growing rapidly, while human losses may be declining. From another perspective, long-term trends in *exposure* and *vulnerability* to natural hazards can also be observed by considering socio-demographic shifts in populations relative to hazard-prone areas. Here, a case study of metropolitan Vancouver is presented to examine the multiplicity of factors influencing the likelihood of earthquake losses and how these factors have been changing over time, individually and interactively.

The study also raises the question of whether the Vancouver results are likely to be unique or can be generalized to other urban areas. While the lack of available modeling studies precludes a definitive answer, some insights can nonetheless be gained by considering other cities whose urban development patterns and histories differ notably from Vancouver's. The discussion considers changes in some major risk factors in selected urban areas in the U.S. and around the world.

Directions

800 Robson Street, Vancouver, BC

"Are our cities becoming safer, due to advances in earthquake engineering? Or is risk growing as a result of societal factors such as population expansion and urban development?"

www.seabc.ca
E-mail: info@seabc.ca

November Seminar

AN INTRODUCTION TO BLAST-RESISTANT DESIGN

Date: November 30, 2011
Venue: Room C300, UBC Robson Square, 800 Robson Street, Vancouver
Time: Refreshments 6:00 p.m. Presentation 6:30 p.m.
Presenter: Rainer Herzinger, Ph.D., P.Eng., Stantec Consulting Ltd.
Cost: Free for SEABC Members. $75 + HST for non-members
Pre-registration is required: www.seabc.ca/blast

This presentation will introduce participants to the characteristics of a blast wave and its effect on building structures. We will discuss the design goal for blast resistant structures and the difference between blast resistant design and seismic design. The presentation will explain possible response modes of structural elements, ranging from quasi-static to impulsive, and how this affects the damage potential of a structure. The use of response limits will be explained, and their correlation to the amount of damage to be expected. The presentation will demonstrate the use of single degree of freedom systems and finite element methods. We will touch on design approaches to prevent progressive collapse and how they complement blast resistant design. The presentation will conclude with recommendations for detailing of reinforced concrete elements subject to blast.

Rainer Herzinger is a structural engineer with Stantec Consulting Ltd. He has seven years of experience in the design and construction administration of bridge and building projects. He has worked on numerous projects involving blast resistant design requirements, ranging from refinery plants designed to resist the effects of accidental explosions to office towers designed to withstand the potential threat of intentionally caused explosions.

Rainer's academic background includes a civil engineering degree from the University of Stuttgart (Germany), and a Ph.D. in structural engineering from the University of Calgary. He was involved in teaching structural concrete and steel design courses at the University of Calgary. Rainer's areas of research include nonlinear finite element analysis of concrete structures and the development of innovative reinforcing details in dapped ends of precast concrete bridge girders. Rainer's studies at universities in Germany and Canada have allowed him to develop a well-founded understanding of design concepts.